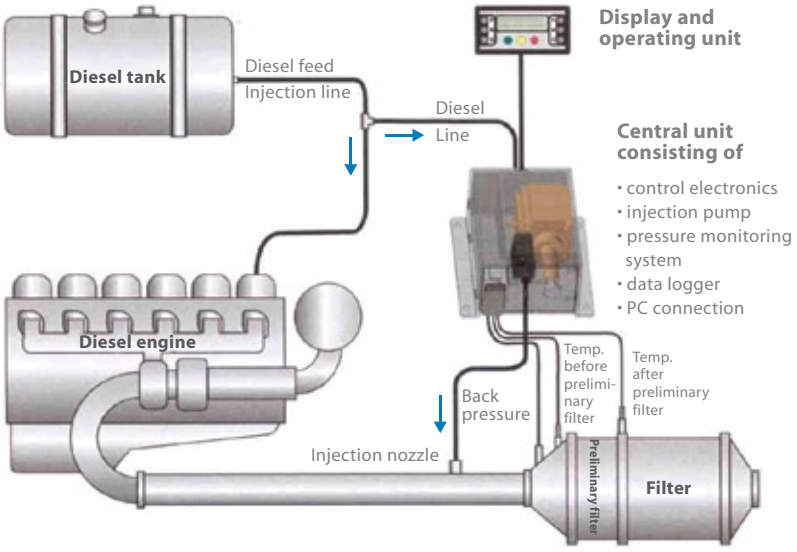
ESW Group of Companies

ADVANCED TECHNOLOGY FOR A CLEANER FUTURE®

Therma Cat™
Particulate Filter System

Product Description

- Particulate Matter (PM_{10}) efficiency greater than 85%
- Automatic regeneration through catalytic filter coating and automatic diesel injection
- System is suitable for permanent and multi-shift operation
- Regeneration can start @ 190°C making it suitable for severe stop-and-go applications
- System is compliant with CARB NO_2 regulations for 2009
- OE Muffler replacement system
- Electronic Control unit and data logger integrated in one unit



Function Description

- Soot oxidation through catalytic filter coating (without diesel injection)
- Exhaust gas temperature increases through additional diesel injection
- Automatically activated diesel injection for controlled regeneration
- Diesel injection is automatically controlled via before/after temperature of the pre-filter

System Feature, Construction & Function

The **Therma Cat™** comprises a combined filter system that integrates active regeneration (diesel injection) and a passive component (catalytic filter coating). The **Therma Cat™** is designed for vehicles and equipments operating on a low load cycle, i.e. operating with low exhaust gas temperatures. Purely passive regeneration would not work in this case. With the **Therma Cat™**, filter regeneration is automatically controlled during normal use, removing any need for driver intervention and vehicle downtime.

As long as the vehicle is operated at sufficient load, i.e. with exhaust gas temperatures over 280°C, the particle filter will regenerate itself by means of the catalytic filter coating. Activation of the diesel injection is not necessary at that point. If, however, the vehicle is run for longer periods of time without higher loads (exhaust gas temperatures < 280°C), then the filter will be charged with soot particles and the system backpressure will increase.

When a preset exhaust gas backpressure level has been reached, the electronic control automatically activates the diesel injection. Diesel injection takes place into the exhaust gas stream, upstream of the filter system. The diesel fuel is "injected" into the exhaust as a fine mist through an injection nozzle by means of a high-pressure injection pump (component of the central unit). The preliminary filter upstream of the particle filter then oxidizes the diesel exhaust gas mixture.

The diesel fuel injected is converted into heat, which raises the exhaust gas temperature. With this state-of-the-art technology, the exhaust gas temperature can be heated to more than 400°C during the operation of the vehicle

Two temperature sensors (temp. before/after preliminary filter) control the initiation, duration and quantity of the diesel injection. The diesel injection is activated by a preset exhaust gas backpressure value. When the necessary exhaust gas temperature for the diesel oxidation (temp. before preliminary filter) is exceeded and the system has reached the required maximum exhaust gas temperature (temp. after preliminary filter) for filter regeneration, the injection amount is throttled to avoid overheating of the system. Once the filter regeneration is complete (low backpressure), the diesel injection stops automatically. The additional fuel consumption necessitated by the diesel injection is not measurable during use and is less than 1 percent.

The **Therma Cat™** system contains a filter monolith made of an appropriate heat-resistant material and features high soot loading capabilities, resulting in a longer than usual life cycle. Additionally, the preliminary filter, especially developed for the system, consists of an ESW proprietary stainless steel wire mesh substrate.

This unique substrate design assures that the injected diesel is appropriately mixed into the exhaust gas stream and completely oxidized at low temperature, i.e. converted into heat energy.

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